



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/741,529	12/19/2000	Quanyuan Shang	005434	6382

32588 7590 01/16/2004

APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER

KORNAKOV, MICHAEL

ART UNIT PAPER NUMBER

1746

DATE MAILED: 01/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/741,529

Applicant(s)

SHANG ET AL.

Examiner

Michael Komakov

Art Unit

1746



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-12 and 15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-12 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 12/19/03.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 12/19/2003 has been entered.

Specification

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. The recited in claim 8 term "hydrofluoric acid" is not provided by the instant disclosure. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 8-12 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the use of hydrofluoric **acid** to generate fluorine cleaning gas.

Condensed Chemical Dictionary defines hydrofluoric acid as "Hydrogen fluoride in aqueous solution" (page 614, left column). However, the instant disclosure recites the use of "feed **gas** (e.g. HF) for chemical conversion to a cleaning gas (F₂)" (page 6) and "the step of converting a feed **gas** to a cleaning gas" (page 8, last paragraph).

Therefore, it is not clear, whether the cleaning gas (F₂) is obtained from aqueous solution of hydrogen fluoride, wherein the step of transferring the aqueous solution of hydrogen fluoride into gaseous HF is omitted, or the cleaning gas is produced from HF gas in liquid form, as illustrated by drawings, Fig. 1 and 2. In specific regard to claim 15, it is not clear the electrolysis of which ingredient(s), is utilized in order to obtain fluorine.

Due to their indefinite character, claims 8 and 15 are given the broadest and commonest interpretation.

Claims 9-12 are rejected because of their dependency and failure to remove the ambiguity of independent claim 8.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 8-12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shang et al (U.S. 5,788,778) in view of WO 00/52740 and in further view of Hodgson (U.S. 5,378,324).

Shang teaches a method of cleaning a deposition chamber that is used in fabricating electronic devices. The method of Shang comprises delivery of reactive gas, such as **fluorine** (reads on "fluorine cleaning gas", as instantly claimed), into remote plasma chamber, that is outside of the deposition chamber, activating the reactive gas utilizing microwave energy and **flowing the activated reactive gas from the remote chamber into the deposition chamber** to clean the inside of the deposition chamber (see Abstract; col.5, lines 31-36; col.6, lines 23-29; col.7, lines 1-3).

The teaching of Shang remains silent about generating the fluorine cleaning gas on-site in communication with the processing system and about specificities of obtaining and storing the fluorine cleaning gas. However, these steps are practically immaterial for the cleaning process per se, unless criticalities of such specific steps are provided. Besides, local positioning of gas producing/delivery system is known in the art. Thus, WO'740 teaches gas delivery system for plasma processing, utilizing local (point of use) (reads on "on-site", as instantly claimed) positioning of **molten electrolyte fluorine generator**, wherein the said generator is located in communication with the processing system, but remote to the process chamber so that created fluorine can be delivered directly to the chamber or system for immediate use rather than being created offsite and transported in a suitable container for subsequent introduction into the apparatus (Abstract, page 2, lines 17-23; page 5, lines 16-18, lines 23; page 8, line 16; Fig. 1). WO'740 clearly motivates the skilled artisan to utilize on site fluorine generator by listing the advantages of using such system (pages 3-5).

Therefore, one skilled in the art, motivated by the teaching of WO'740, at the time the invention was made, would have found it obvious to generate fluorine cleaning gas on site in order to reduce the cost of processing and enhance the safety issues compare to conventional cylinder fluorine gas delivery in the method of Shang and thus to arrive at the subject matter, as instantly claimed.

While teaching the use of molten electrolyte fluorine generator on site, the combined teaching of Shang/WO'742 does not specifically indicate the step of transferring the gas mixture, formed during its operation, to a cold trap. However, cryogenic techniques are known and widely utilized in the art in order to remove HF to a considerable extent from the gaseous mixture, consisting essentially of HF gas and fluorine gas, as indicated by Hodgson, who teaches the process for the production of fluorine from fused electrolyte (col.4, lines 62-64; col.5, lines 26-31).

Therefore, one skilled in the art, motivated by the teaching of Hodgson, at the time the invention was made would have found it obvious to utilize the conventional cryogenic techniques (cold traps) in order to obtain high purity fluorine in the combined teaching of Shang/WO'742 with the reasonable expectation of success.

In specific regard to claim 9, the skilled artisan would have found it obvious to provide the on-site storage unit in order to collect and precisely distribute fluorine to the processing system in the combined teaching of Shang/WO'742/Hodgson.

9. Therefore, combination of references renders claims 8-12 and 15 prima facie obvious and properly rejected under 35 U.S.C. 103(a).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

Application/Control Number: 09/741,529
Art Unit: 1746

Page 7

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272 1700.

M. Kornakov

01/12/04

Michael Kornakov
Examiner
Art Unit 1746